Doc. no. LEC-OM07303

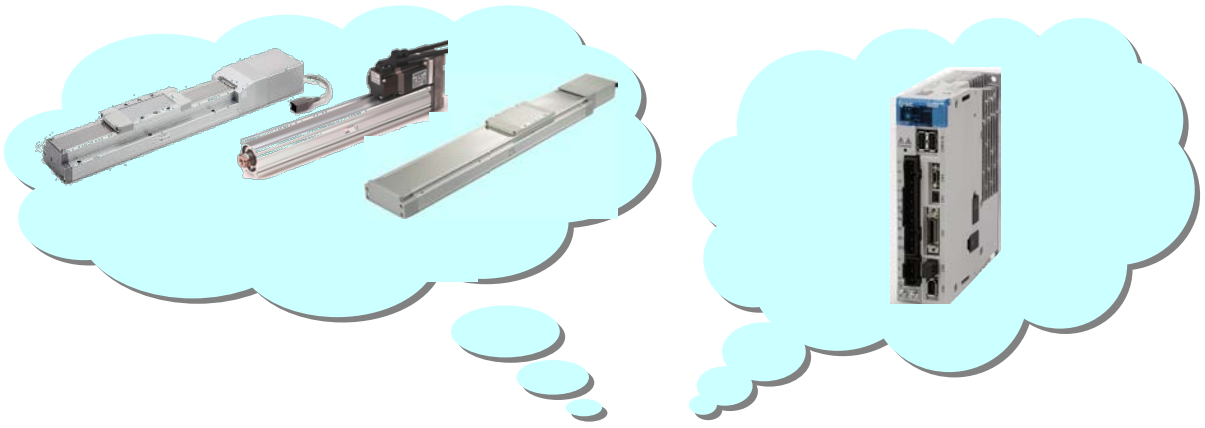
Operation Manual
(Simplified edition)

PRODUCT NAME

AC Servo Motor Driver (MECHATROLINK-II type)

MODEL / Series / Product Number

LECYM Series



SMC Corporation

Contents

Introduction 6

1. Procedure before operation 7
   1.1 Flow chart 7

2. Wiring 8
   2.1 System configuration 8
   2.2 Wiring for power supply 9
   2.3 Wiring for Safety cable 11
   2.4 Wiring for external regenerative resistor 12
   2.5 MECHATROLINK cable wiring 13

3. Communications Setting 14

4. Parameter setting (Driver side) 17
   4.1 power supply specifications 17
   4.2 Overtravel 17
   4.3 Rotation Direction 18
   4.4 Electronic Gear 19
      4.4.1 List of the electronic gear setting for each actuator 20
   4.5 Positioning Completed Width 21
   4.6 Regenerative Resistor 21

5. Trial Operation (SigmaWin+) 22
   5.1 Communications setting for PC 22
   5.2 JOG Operation 24
   5.3 Program JOG Operation 26

6. The recommended the parameter for each actuator 29
   6.1 The recommended value of the parameter [LEF] 29
   6.2 The recommended value of the parameter [LEJ] 30
   6.3 The recommended value of the parameter [LEY] 30

LECYM Series / Driver Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage.
These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.”
They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems
ISO 4413: Hydraulic fluid power -- General rules relating to systems
IEC 60204-1: Safety of machinery -- Electrical equipment of machines (Part 1: General requirements)
ISO 10218-1992: Manipulating industrial robots -- Safety
JIS B 8370: General rules for pneumatic equipment.
JIS B 8361: General rules for hydraulic equipment.
JIS B 9960-1: Safety of machinery – Electrical equipment for machines. (Part 1: General requirements)
JIS B 8433-1993: Manipulating industrial robots - Safety. etc.

*2) Labor Safety and Sanitation Law, etc.

Caution	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
Warning	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Danger	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
IMPORTANT	Indicates **important** information that should be memorized, as well as precautions, such as alarm displays, that do not involve potential damage to equipment.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.
The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.
This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly.
The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
1) Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2) Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3) An application which could have negative effects on people, property, or animals requiring special safety analysis.
4) Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Note that the ⚠CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

LECYM Series / Driver Safety Instructions

⚠ Caution

The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.
Read and accept them before using the product.

Limited warranty and Disclaimer

The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*3) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***3) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).

Introduction

It is recommended that the operator read the operation manual for LECYM prior to use.
For the handling and details of other equipment, please refer to the operation manual for used equipment.

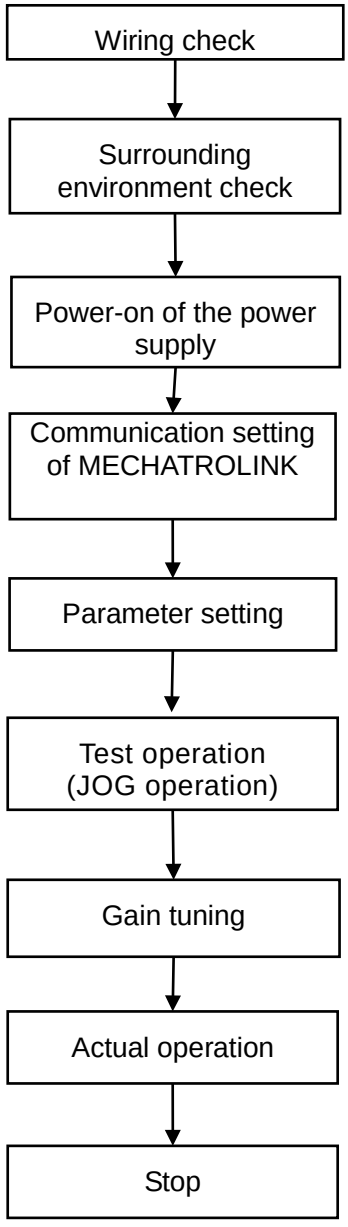
Select ΣV as an object series when you use SigmaWin+.
Refer to the table for the following type when you select the model (parameter edit at offline etc.).

Driver type	Driver select		Motor select	
	SMC	Sigma Win+	SMC	Sigma Win+
MECHATROLINK-Ⅱ	LECYM2-**	SGDV-****11* Y572AA	V5	SGDV-R90A11B
			V7	SGDV-1R6A11B
			V8	SGDV-2R8A11B
			V9	SGDV-5R5A11A

Please download setup software (SigmaWin+) via our website.
Refer to chapter 2.2 of operation manual for LECYM for method of installing setup software (SigmaWin+).

1. Procedure before operation

1.1 Flow chart



- - -

Confirm that the cables to the driver and the actuator are connected correctly.
Refer to [2. Wiring].

- - -

Check the surrounding environment (cable routing and impurity such as wire off cuts or metallic dust) of the driver and the servo motor.

- - -

Follow the procedure shown in the "LECYM Operation Manual" to supply power to the product. When the power supply is turned on first, it is necessary to set up the absolute encoder. (Only the absolute encoder) Refer to [2. Wiring].

- - -

Set the MECHATROLINK communication.
Refer to [3. Communication setting].

- - -

Set the parameters.
Refer to [4. Parameter setting (Driver side)].

- - -

Use the test operation mode (JOG operation) at the slowest speed and check whether the servo motor rotates.
Refer to [6. Trial Operation (SigmaWin+)].

- - -

Operation with a vibration might be done according to the condition.In that case, adjust gain.
Refer to the operation manual for LECYM.

- - -

Check if the cables to the driver and actuator are connected correctly.
* "Return to home position" and "Positioning operation" etc. are possible by the instruction from PLC.
Refer to the manual of the PLC for details.

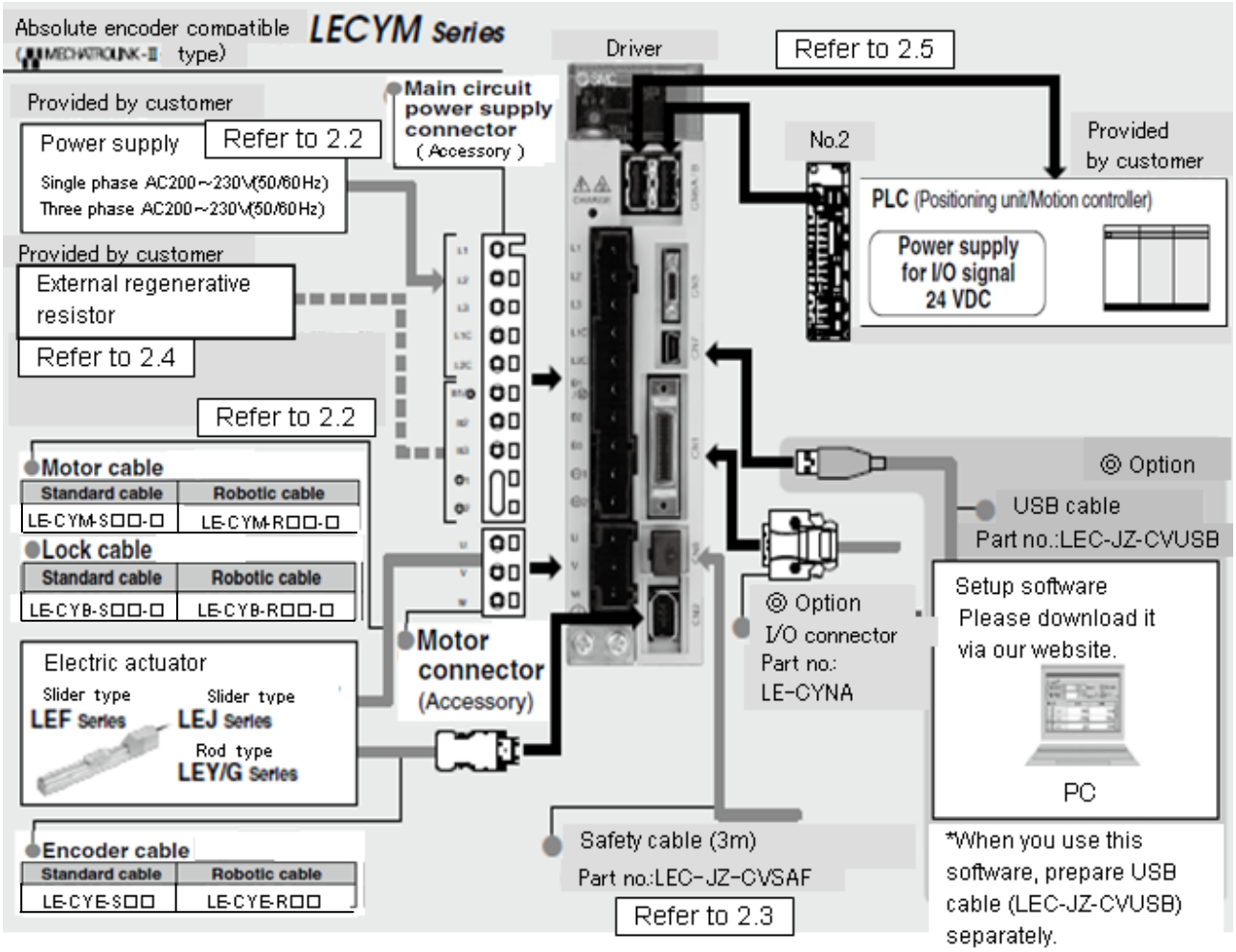
- - -

Stop command to stop the operation.

2. Wiring

2.1 System configuration

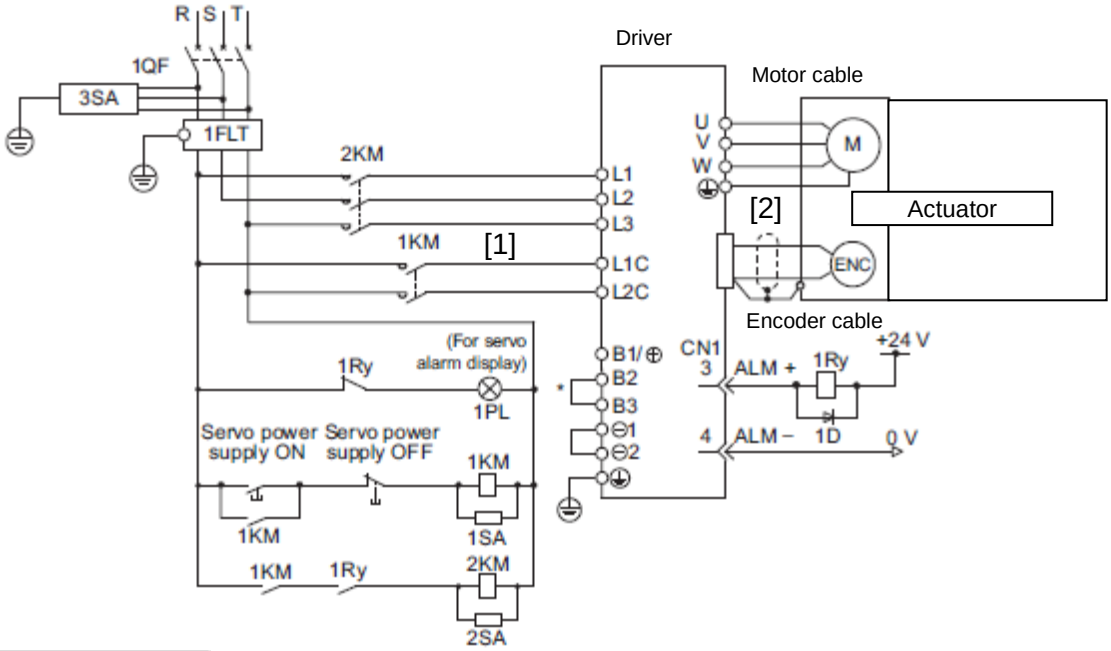
The system configuration chart is shown below.
Refer to the next paragraph for details of the wiring for each cable.



2.2 Wiring for power supply

Connect the actuator and driver power supply.

(1) Power supply is AC200V three phase



Electric wire specifications

Item	Specifications
Applicable Wire size	L1, L2, L3, L1C, L2C Single line, twisted wire AWG14 (20mm^2)
Stripped section length	8~9mm

1QF: Molded-case circuit breaker
1FLT: Noise filter
1KM: Magnetic contactor (for control power supply)
2KM: Magnetic contactor (for main circuit power supply)
1Ry: Relay

1PL: Indicator lamp
1SA: Surge absorber
2SA: Surge absorber
3SA: Surge absorber
1D: Flywheel diode

∗ For the LECYM2-V5, V7, V8, terminals B2 and B3 are not short-circuited.
Do not short-circuit these terminals.

[1] Main circuit power input terminals, L1, L2, L3 and Control power input terminals, L1, L2: Connect the 200VAC external power supply to the power supply. Refer to the power supply specification for the size of the acceptable electric wire.

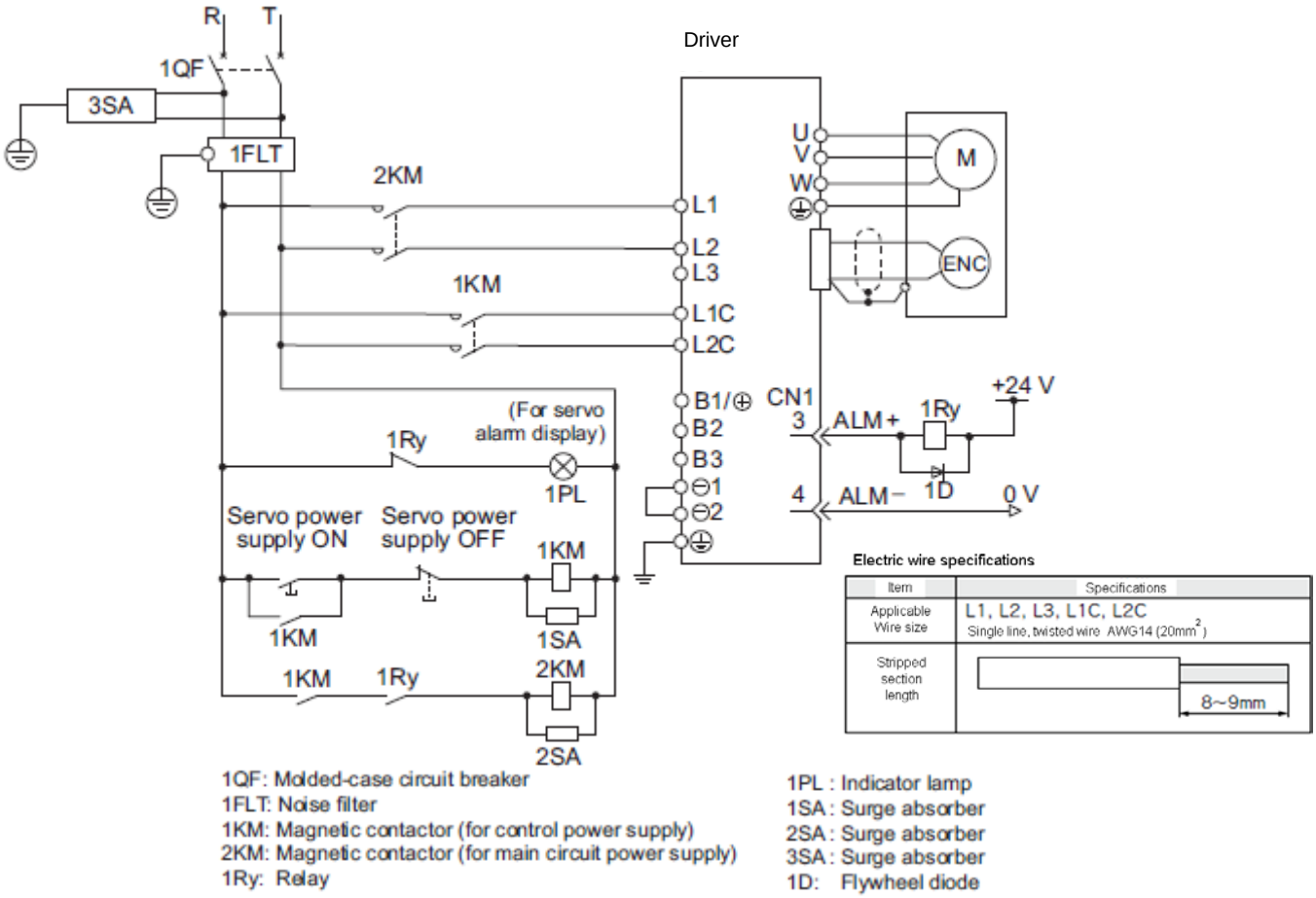
[2] Connect the motor cable (U, V, W) to the servomotor connection terminals (U, V, W).
Connect the motor ground terminal to the driver ground terminal.
Connect the encoder cable to the encoder cable connector.

*Please connect lock connection terminal (B) with the DC24V power supply for the motor cable with the lock.

IMPORTANT

When starting the machine for the first time, setting up and reinitialization of the absolute encoder are necessary. When the absolute encoder is used as the incremental encoder, it is unnecessary.
In the SigmaWin+ main window, click **Setup**, point to **Set Absolute Encoder** and click **Reset Absolute Encoder**.
The absolute encoder can only be set up while the servo is off. Turn the power back on after the encoder has been successfully set up.

(2) Power supply is AC200V single phase



∗ For the LECYM2-V5, V7, V8, terminals B2 and B3 are not short-circuited.
Do not short-circuit these terminals.

[1] Main circuit power input terminals, L1, L2 and Control power input terminals, L1, L2: Connect the 200VAC external power supply to the power supply. Refer to the power supply specification for the size of the acceptable electric wire.
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Connect the motor ground terminal to the driver ground terminal.
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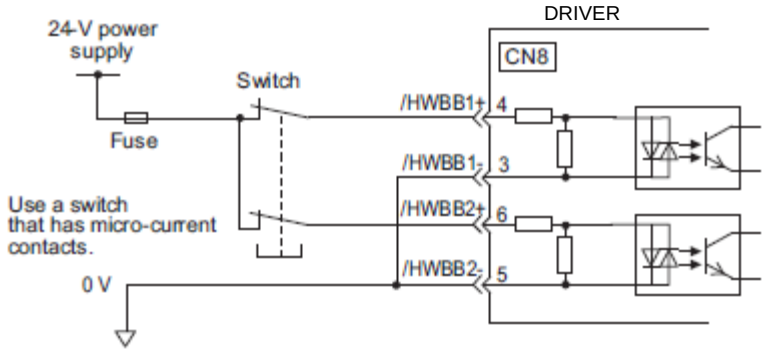
IMPORTANT

When starting the machine for the first time, setting up and reinitialization of the absolute encoder are necessary. When the absolute encoder is used as the incremental encoder, it is unnecessary.
In the SigmaWin+ main window, click **Setup**, point to **Set Absolute Encoder** and click **Reset Absolute Encoder**.
The absolute encoder can only be set up while the servo is off. Turn the power back on after the encoder has been successfully set up.

2.3 Wiring for Safety cable

(1) Connection Example for input signals

The input signals must be redundant.



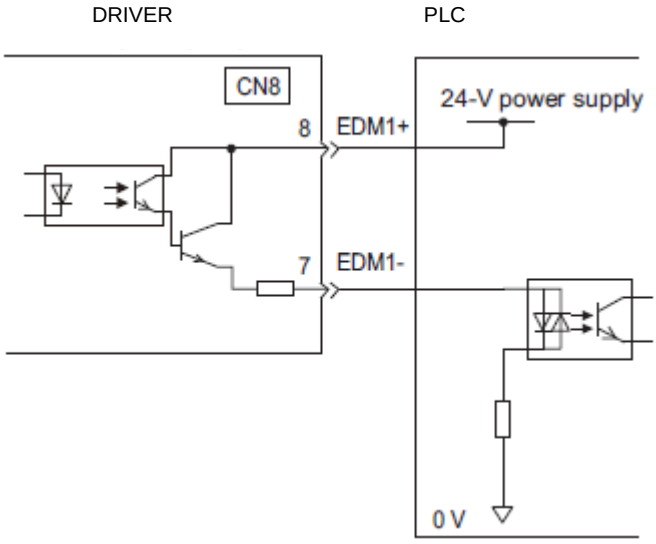
IMPORTANT

For safety function signal connections, the input signal is the 0 V common and the output signal is the source output.

When using the safety function, a safety function device must be connected and the wiring that is necessary to activate the safety function must be done to turn ON the servomotor power. When not using the safety function, use the DRIVER with the Safety Jumper Connector (provided as an accessory) inserted into the CN8.

(2) Connection Example for output signals

EDM1 output signal is used for source circuit. **It is not able to use the sink output.**



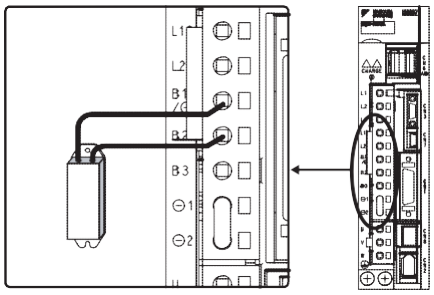
2.4 Wiring for external regenerative resistor

Please prepare it in your company when the external regenerative resistor is necessary.
Refer to the catalog of each actuator for the selection of the external regenerative resistor.

(1) DRIVERs: Model LECYM2-V5, V7, V8

Connect an external Regenerative resistor between the B1/⊖ and B2 terminals on the DRIVER. After connecting a option, select the capacity. For more information on how to set the capacity of Regenerative resistors, refer to *4.6 Regenerative resistor*.

Enlarged View

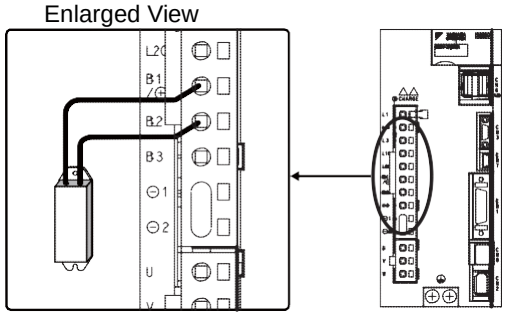


(2) DRIVER: Model LECYM2-V9

Disconnect the wiring between the DRIVER's B2 and B3 terminals and connect an external Regenerative resistor between the B1/⊕ and B2 terminals. After connecting the option, select the capacity. For more information on how to set the capacity of Regenerative resistors, refer to *4.6 Regenerative resistor*.

Note: Be sure to take out the lead wire between the B2 and B3 terminals.

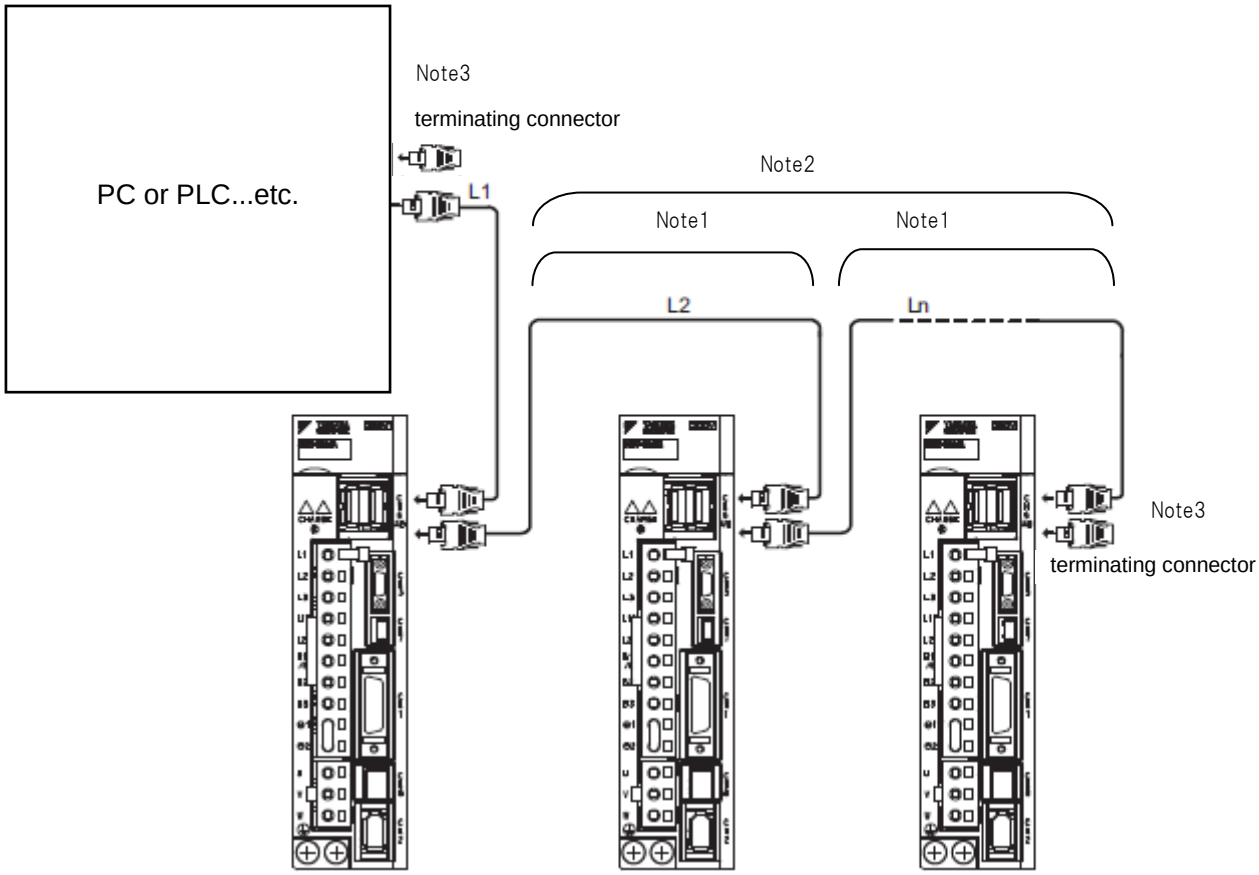
Enlarged View



⚠ WARNING
Be sure to connect the regenerative resistor correctly. Do not short-circuit between B1/ ⊕ and B2. Doing so may result in fire or damage to the regenerative resistor or DRIVER.

2.5 MECHATROLINK cable wiring

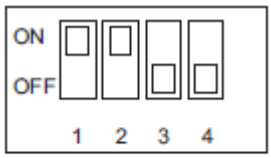
The following diagram shows an example of connections between a PC or PLC... etc and a DRIVER using MECHATROLINK-II communications cables (CN6A, CN6B).



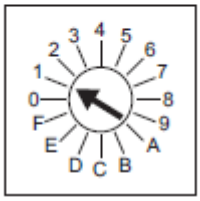
Note 1. The length of the cable between stations (L1, L2 ... Ln) must be 0.5 m or more.
2. The total cable length must be L1 + L2 ... + Ln ≤ 50.
3. Please connect terminating connector with PLC. When multiple DRIVERs are connected by MECHATROLINK-II communications cable, a terminating connector must be installed at the final DRIVER.

3. Communications Setting

The SW2 DIP switch is used to make the settings for MECHATROLINK-II communications. The station address is set using the rotary switch (SW1) and the DIP switch (SW2).



SW2 (factory settings)



SW1 (factory setting)

(1) Settings for the SW2 DIP Switch

The following table shows the settings of the DIP switch (SW2).

SW2	Function	Setting	Description	Factory setting
Pin 1	Sets the baud rate.	OFF	4 Mbps (MECHATROLINK-I)	ON
		ON	10 Mbps (MECHATROLINK-II)	
Pin 2	Sets the number of transmission bytes.	OFF	17 bytes	ON
		ON	32 bytes	
Pin 3	Sets the station address.	OFF	Station address = 40H + SW1	OFF
		ON	Station address = 50H + SW1	
Pin 4	Reserved. (Do not change.)	OFF	–	OFF

IMPORTANT

- When connecting to a MECHATROLINK-I network, turn OFF pins 1 and 2.
- When using a MECHATROLINK-I network (Baud rate: 4 Mbps), the settings for the number of transmission bytes is disabled and the number of transmission bytes is always 17.

(2) Setting the Station Address

The following table lists the possible settings of the rotary switch (SW1) and the DIP switch (SW2) that can be combined to form a station address.

The factory setting for the station address is 41H (SW2 = OFF, SW1 = 1).

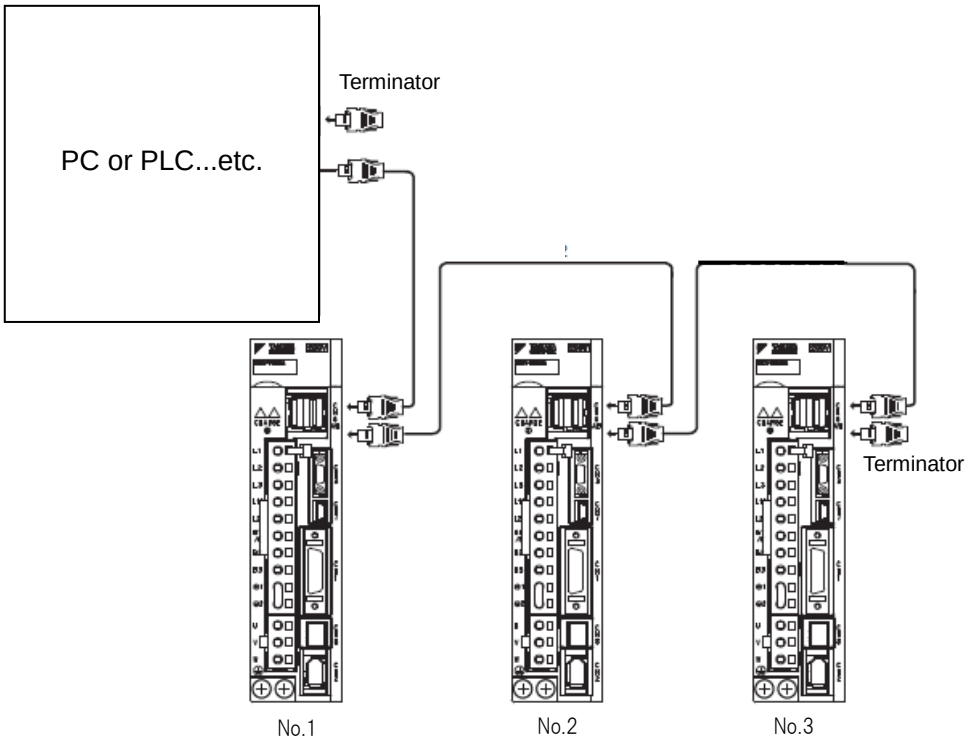
Bit 3 of SW2	SW1	Station Address
OFF	0	Disabled
OFF	1	41H
OFF	2	42H
OFF	3	43H
OFF	4	44H
OFF	5	45H
OFF	6	46H
OFF	7	47H
OFF	8	48H
OFF	9	49H
OFF	A	4AH
OFF	B	4BH
OFF	C	4CH
OFF	D	4DH
OFF	E	4EH
OFF	F	4FH

Bit 3 of SW2	SW1	Station Address
ON	0	50H
ON	1	51H
ON	2	52H
ON	3	53H
ON	4	54H
ON	5	55H
ON	6	56H
ON	7	57H
ON	8	58H
ON	9	59H
ON	A	5AH
ON	B	5BH
ON	C	5CH
ON	D	5DH
ON	E	5EH
ON	F	5FH

IMPORTANT

- Turn the power OFF and then ON again to validate the new settings.

Ex) When you connect three station



Setting the Station Address

	Bit 3 of SW2	SW1	Station Address
N0.1	OFF	1	41H
N0.2		2	42H
N0.3		3	43H

4. Parameter setting (Driver side)

The setting is a necessary parameter. Please optionally set it. Please refer to "LECYM manual" for a detailed parameter.
Setup software (SigmaWin+) is necessary for the setting of the parameter.
※1 Please download setup software via our website.
※2 Prepare USB cable (LEC-JZ-CVUSB) separately.

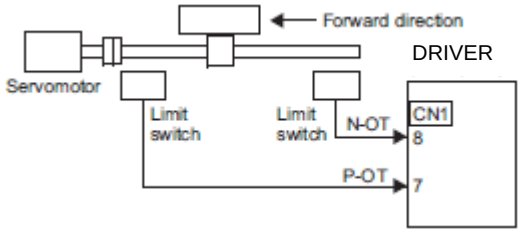
4.1 power supply specifications

When using the DRIVER with single-phase, 200 V power input, set parameter Pn00B.2 to 1.

Parameter		Meaning	When Enabled	Classification
Pn00B	n.□0□□ [Factory setting]	Enables use of three-phase power supply for three-phase DRIVER.	After restart	Setup
	n.□1□□	Enables use of single-phase power supply for three-phase DRIVER.		

4.2 Overtravel

For machines that move using linear motion, connect limit switches to P-OT and N-OT of CN1 as shown below to prevent machine damage. To prevent a contact fault or disconnection from causing accidents, make sure that the limit switches are normally closed.



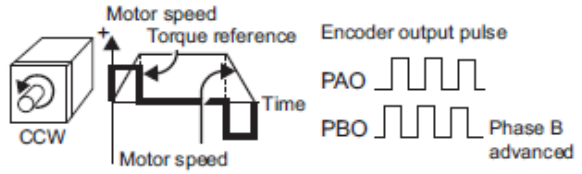
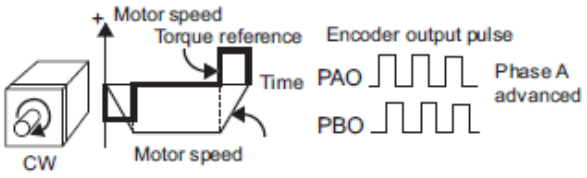
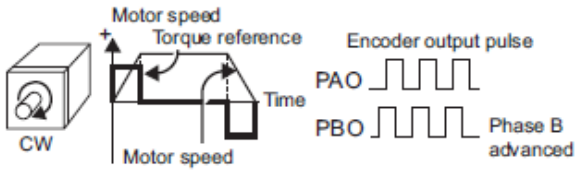
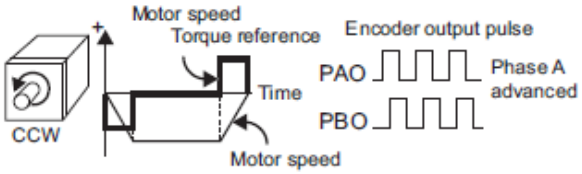
Parameters Pn50A and Pn50B can be set to enable or disable the overtravel function.
If the overtravel function is not used, no wiring for overtravel input signals will be required.

Parameter		Meaning	When Enabled	Classification
Pn50A	n.1□□□ [Factory setting]	Inputs the Forward Run Prohibited (P-OT) signal from CN1-7.	After restart	Setup
	n.8□□□	Disables the Forward Run Prohibited (P-OT) signal. Allows constant forward rotation.		
Pn50B	n.□□□2 [Factory setting]	Inputs the Reverse Run Prohibited (N-OT) signal from CN1-8.		
	n.□□□8	Disables the Reverse Run Prohibited (N-OT) signal. Allows constant reverse rotation.		

*P-OT and N-OT of the factory setting are effective.
Please set it invalidly when you use neither P-OT nor N-OT. (Please set to parameter Pn50A=n.8 □□□ and Pn50B=n. □□□ 8.)

4.3 Rotation Direction

The servomotor rotation direction can be reversed with parameter Pn000.0 without changing the polarity of the speed/position reference. This causes the rotation direction of the servomotor to change, but the polarity of the signal, such as encoder output pulses, output from the DRIVER does not change.

Parameter		Forward/ Reverse Reference	Direction of Motor Rotation and Encoder Output Pulse	Applicable Over-travel (OT)
Pn000	n.□□□0 Sets CCW as forward direction. [Factory setting]	Forward Reference		P-OT
		Reverse Reference		N-OT
	n.□□□1 Sets CW as forward direction. (Reverse Rotation Mode)	Forward Reference		P-OT
		Reverse Reference		N-OT

4.4 Electronic Gear

It is necessary to set it on the PLC side according to the kind of PLC.

The electronic gear enables the workpiece travel distance per reference unit input from the host PC or PLC...etc. The minimum unit of the position data moving a load is called a reference unit.

Set the electronic gear ratio using Pn20E and Pn210.

Pn20E	Electronic Gear Ratio (Numerator)			Position	Classification
	Setting Range	Setting Unit	Factory Setting	When Enabled	
	1 to 1073741824	1	4	After restart	Setup
Pn210	Electronic Gear Ratio (Denominator)			Position	Classification
	Setting Range	Setting Unit	Factory Setting	When Enabled	
	1 to 1073741824	1	1	After restart	Setup

$$\frac{\text{・Pn20E}}{\text{・Pn210}} = \frac{M \times P \times (1/1000)}{\text{Actuator lead } L[mm] \times (n1/n2)}$$

M : Servo motor resolution is 1048576 [Pulse/rev]
P : Travel amount per 1 command pulse [μm]
n1/n2 : Pulley ratio *1

Ex.) To Travel amount per 1 command pulse (P=1μm) by actuator lead (L = 6mm) and pulley ratio (n1/n2 = 1/1)

$$\frac{Pn20E}{Pn210} = \frac{1048576 \times 1 \times \frac{1}{1000}}{6 \times 1/1}$$

$$\frac{Pn20E}{Pn210} = \frac{1048576}{6 \times 1000}$$

$$\frac{Pn20E}{Pn210} = \frac{1048576}{6000}$$

$$\frac{Pn20E}{Pn210} = \frac{65536}{375}$$

*1 For pulley ratio, refer to Lead of “LECYM Operation Manual (Simplified Edition)”,section 4.4.1. The actuator not described for pulley ratio is calculated by “1/1”.

IMPORTANT

Electronic gear ratio setting range: 0.001 ≤ Electronic gear ratio (B/A) ≤ 4000
If the electronic gear ratio is outside this range, a parameter setting error 1 (A.040) will be output.

4.4.1 List of the electronic gear setting for each actuator

The recommended the electronic gear for each actuator.
Please change the electronic gear by use of the customer.

Series		Lead symbol	Lead (Including pulley ratio)	Pn20E	Pn210
LEY	LEY25/LEYG25 LEY25D/LEYG25D	A	12	65536	750
		B	6		375
		C	3	131072	375
	LEY32/LEYG32 LEY63D	A	20	65536	1250
		B	10		625
		C	5	131072	625
	LEY32D/LEYG32D	A	16	65536	1000
		B	8		500
		C	4		250
	LEY63	A	20		1250
		B	10		625
		C	5	131072	625
		L	5(2.86) (Pulley ratio 4/7)	229376	625
LEF	LEFS25	H	20	65536	1250
		A	12		750
		B	6		375
	LEFS32	H	24		1500
		A	16		1000
		B	8		500
	LEFS40	H	30		1875
		A	20		1250
		B	10		625
	LEFB25	S	54		3375
	LEFB32	S			
	LEFB40	S			
LEJ	LEJB40	T	27	131072	3375
	LEJB63	T	42	65536	2625
	LEJS40	H	24		1500
		A	16		1000
		B	8		500
	LEJS63	H	30		1875
		A	20		1250
		B	10		625

*The travel distance of the actuator per 1 pulse should be 1 [μm/pulse].

4.5 Positioning Completed Width

This signal indicates that servomotor movement has been completed during position control.

When the difference between the number of references output by the host PC or PLC...etc and the travel distance of the servomotor (position error) drops below the set value in the parameter, the positioning completion signal will be output.

Note: Use parameter Pn50E.0 to allocate the /COIN signal for use. Refer to the operation manual for LECYM *3.3.2 Output Signal Allocations* for details.

Pn522	Positioning Completed Width			Position	Classification
	Setting Range	Setting Unit	Factory Setting	When Enabled	
	0 to 1073741824	1 reference unit	7	Immediately	Setup

The positioning completed width setting has no effect on final positioning accuracy.

Note: If the parameter is set to a value that is too large, a positioning completed signal might be output if the position error is low during a low speed operation. This will cause the positioning completed signal to be output continuously. If this signal is output unexpectedly, reduce the set value until it is no longer output.

4.6 Regenerative Resistor

Please prepare it in your company when the external regenerative resistor is necessary.
Refer to the catalog of each actuator for the selection of the external regenerative resistor.

When using an external Regenerative resistor, set the Pn600 so that the Regenerative resistor capacity is equivalent to the resistor capacity.

⚠ WARNING

If parameter Pn600 is set to 0 while an external Regenerative resistor is connected, the regenerative over- load alarm (A.320) may not be detected. If the regenerative overload alarm (A.320) is not detected correctly, the external Regenerative resistor may be damaged and an injury or fire may result.

Pn600	Regenerative resistor Capacity			Speed Position Torque	Classification
	Setting Range	Unit	Factory Setting	When Enabled	
	0 to DRIVER capacity	10 W	0	Immediately	Setup

Be sure to set the Regenerative resistor capacity (Pn600) to a value that is in accordance with the allowable capacity of the actual external Regenerative resistor being used.

The setting will vary with the cooling method of external Regenerative resistor:

For natural convection cooling: Set the value to a maximum 20% of the actually installed regenerative option capacity (W).
For forced convection cooling: Set the value to a maximum 50% of the actually installed regenerative option capacity (W).

Example: Set 20 W (100 W × 20%) for the 100-W external Regenerative resistor with natural convection cooling method:
Pn600 = 2 (unit: 10 W)

Note 1. If Pn600 is not set to the optimum value, alarm A.320 will occur.
2. When set to the factory setting (Pn600 = 0), the DRIVER's built-in option has been used.

IMPORTANT

- When the external Regenerative resistors for power are used at the rated load

ratio, the resistor temperature increases to between 200 ˚C and 300 ˚C. The resistors must be used at or below the rated values. Check with the manufacturer for the resistor's load characteristics.

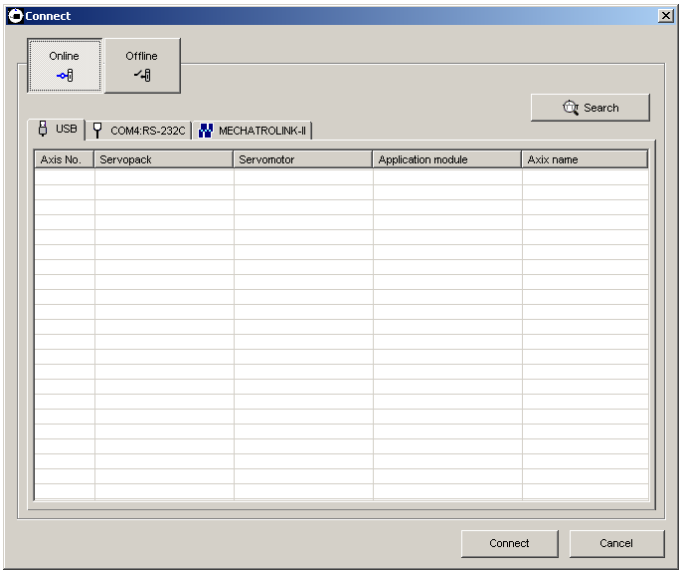
- For safety, use the external Regenerative resistors with thermoswitches.

5. Trial Operation (SigmaWin+)

The procedure of the test driving with setup software (SigmaWin+) is shown below. When use the setup software (SigmaWin+), order USB cable (LEC-JZ-CVUSB) separately.

5.1 Communications setting for PC

When SigmaWin+ is initially started, the Connect dialog box appears. Enter the settings for communications between SigmaWin+ and the DRIVER by means of a communication port.

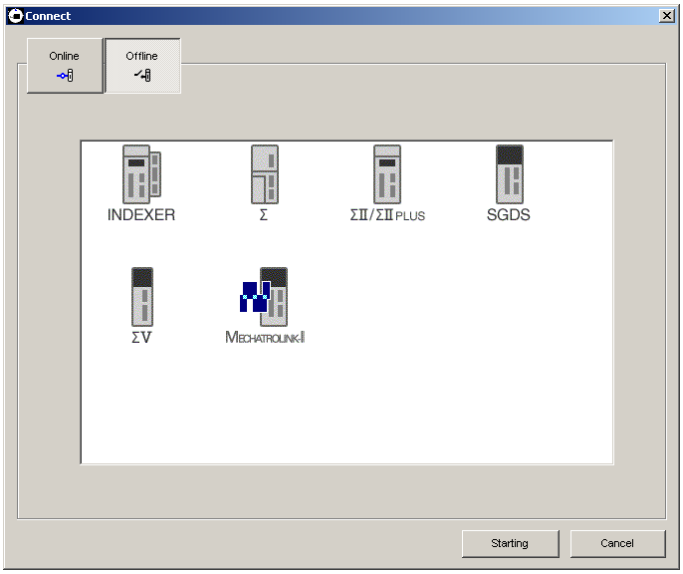


Select the method to set up the DRIVER: online or offline. Online is the default setting.

<When Offline is selected>

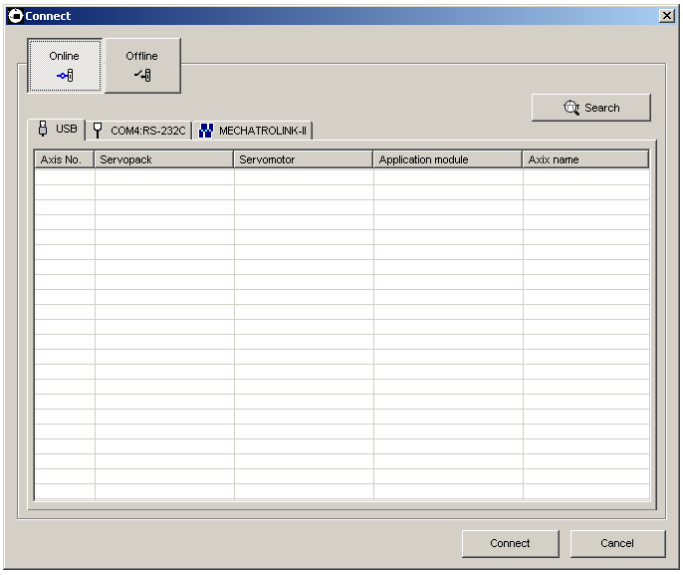
Online: Select when setting up or tuning the servo drive with the DRIVER connected

Offline: Select when editing parameters or checking screens for tracing or mechanical analysis without the DRIVER connected



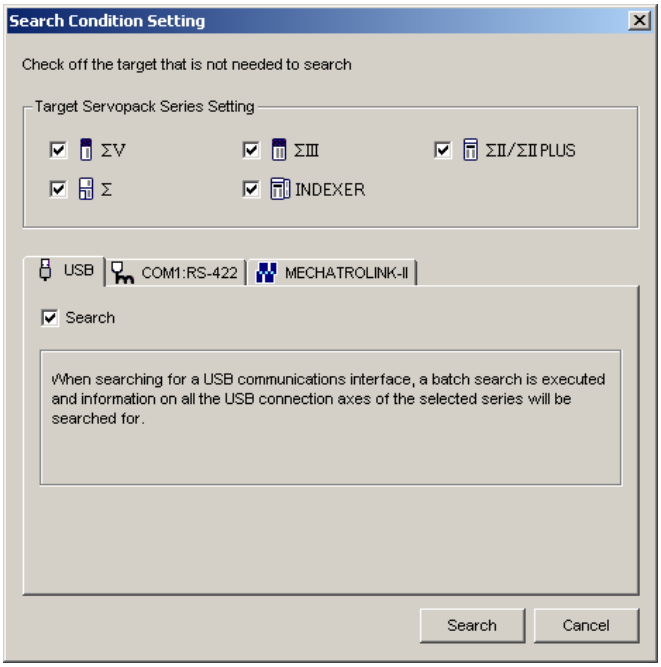
Select the DRIVER series and click **Starting**. The SigmaWin+ main window will appear.

<When Online is selected>

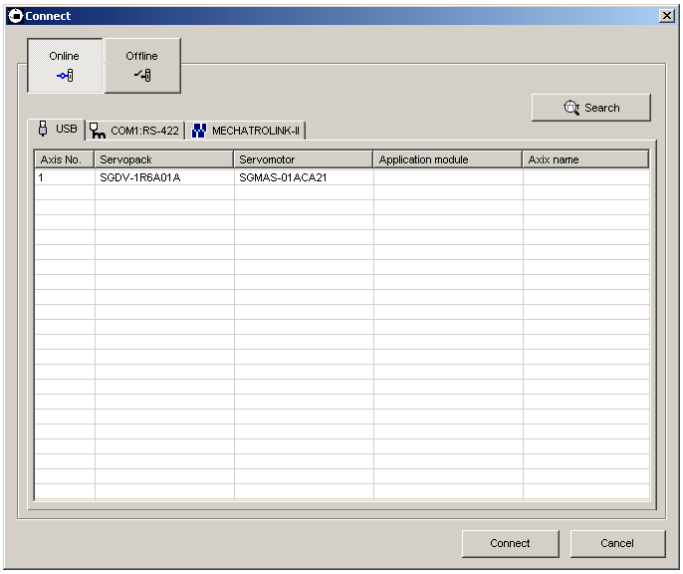


Enter the necessary settings for communication setup.

1. Click **Search**.



2. Select DRIVER series and make the settings required. Click **Search**.
   After the DRIVERs have been successfully connected to SigmaWin+, a list of the connected DRIVERs will appear on the screen.



DRIVER Selection Box

3. Select the DRIVER to be connected and then click **Connect**, or just double-click the DRIVER to be connected. The SigmaWin+ main window will appear.
   Click **Cancel** to close the dialog box.

5.2 JOG Operation

This function turns the motor at the set JOG speed. The rotational direction and the speed setting can be verified without connecting a PC or PLC etc.

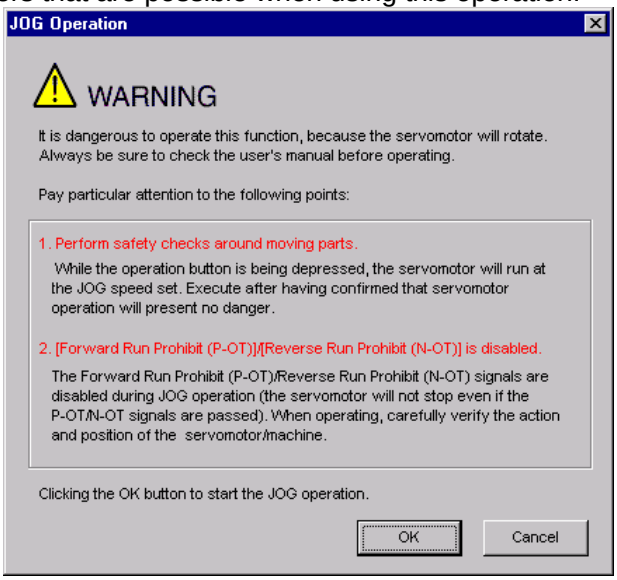
⚠WARNING

Performing JOG operation while the motor is running is dangerous. Be sure to check the user's manual before executing. Pay particular attention to the following.

- Check the safety of the area adjoining the drive unit. The motor runs at the JOG speed, while the Forward or Reverse button is pressed. Make sure that there is no danger in running the motor before execution.
- The Forward Run Prohibit (P-OT) and Reverse Run Prohibit (N-OT) signals are disabled during JOG operation. During operation, make sure to verify the actual operation and position of the motor or machine.

Perform a JOG operation using the following procedure.

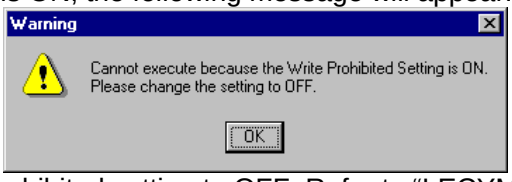
1. In the SigmaWin+ main window, click **Test Run**, and then click **Jog**. A warning message appears reminding you of the dangers that are possible when using this operation.



   Click **Cancel** to return to the main window without performing JOG operation.

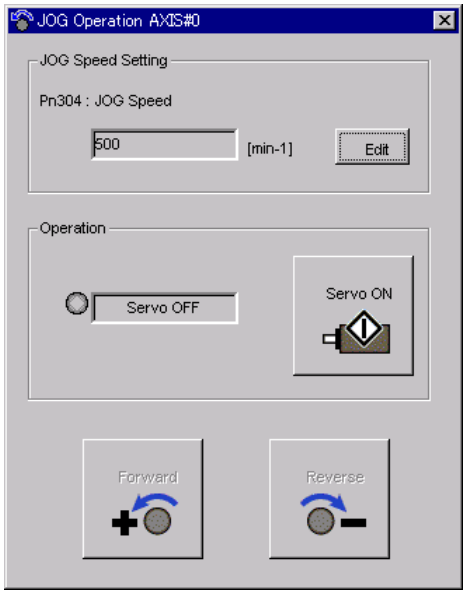
<When the Write Prohibited Setting is ON>

If the write prohibited setting is ON, the following message will appear.



Click **OK**, and set the write prohibited setting to OFF. Refer to “LECYM Operation Manual”, Section 4.4.5 for details.

2. Click **OK**, and the JOG Operation box appears. If the servo is on, an error message will appear. Make sure that the servo is off.



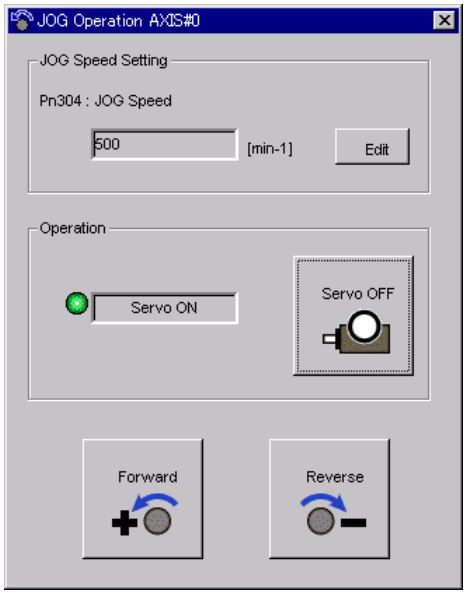
Pn304: JOG Speed

Parameter Pn304 displays the JOG speed. Click **Edit** to change the JOG speed.

Operation

On the left, shows if the servo is on or off and the corresponding LED display. On the right, the button changes according to the servo’s status. When the servo is off, the **Servo ON** button appears; when the servo is on, **Servo OFF** button appears.

3. Check the JOG speed. To change the JOG speed, click **Edit**.
4. Click **Servo ON**.



5. Press **Forward** or **Reverse**. A JOG operation is performed only while one of these buttons is pressed.

5.3 Program JOG Operation

This function allows automatic operation determined by the preset pattern of operation.

⚠WARNING

Using the program JOG operation function while the motor is running is dangerous. Be sure to check the user's manual before using this function. Pay particular attention to the following items.

- Check the safety of the area adjoining the drive unit. The motor actually runs based on a preset pattern when this function is used. Make sure that there is no danger in running the motor before actually using it.
- Confirm the position of the machine. Reset the machine position using the Origin Return function before using the program JOG function.

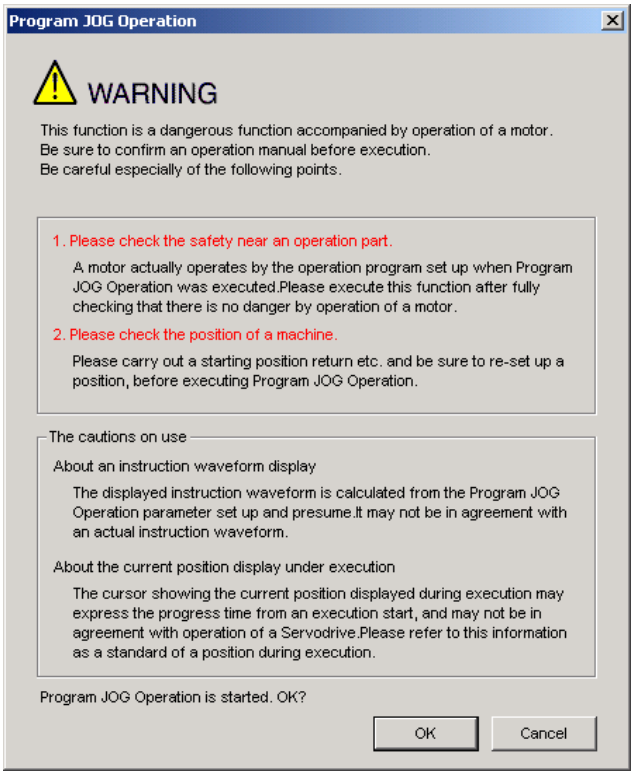
⚠CAUTION

Two methods are available to stop program JOG operation while the motor is running, and the motor will stop according to the method selected. Make sure to select the best method for the situation.

- If the Servo OFF button is used, the motor stops according to the stopping method after servo off specified by the parameters.
- If the Cancel button is used, the motor coasts to a stop and then enters a zero clamp state.
  Note: The Cancel button may not be used with some DRIVERs.

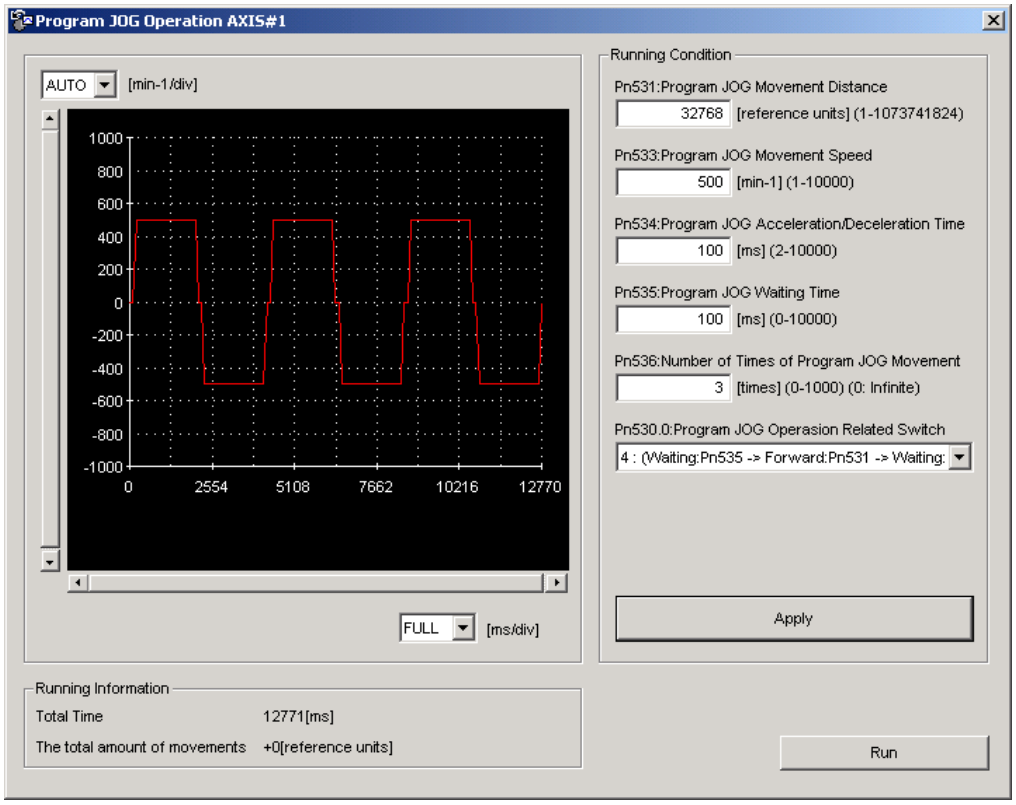
To perform the JOG operation for a particular pattern, use the following procedure.

1. In the SigmaWin+ main window, click **Test Run** and then click **Program JOG Operation**. A warning message appears, reminding you of the possible dangers.

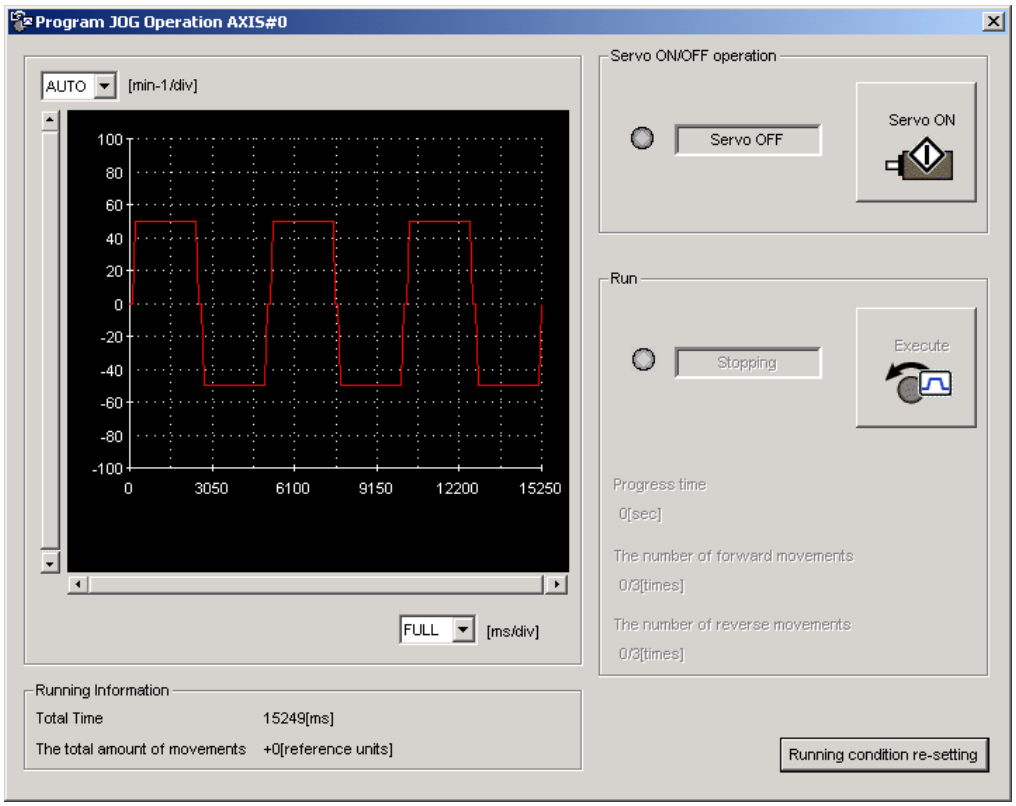


Click **Cancel** to return to the main window without performing program JOG operation.

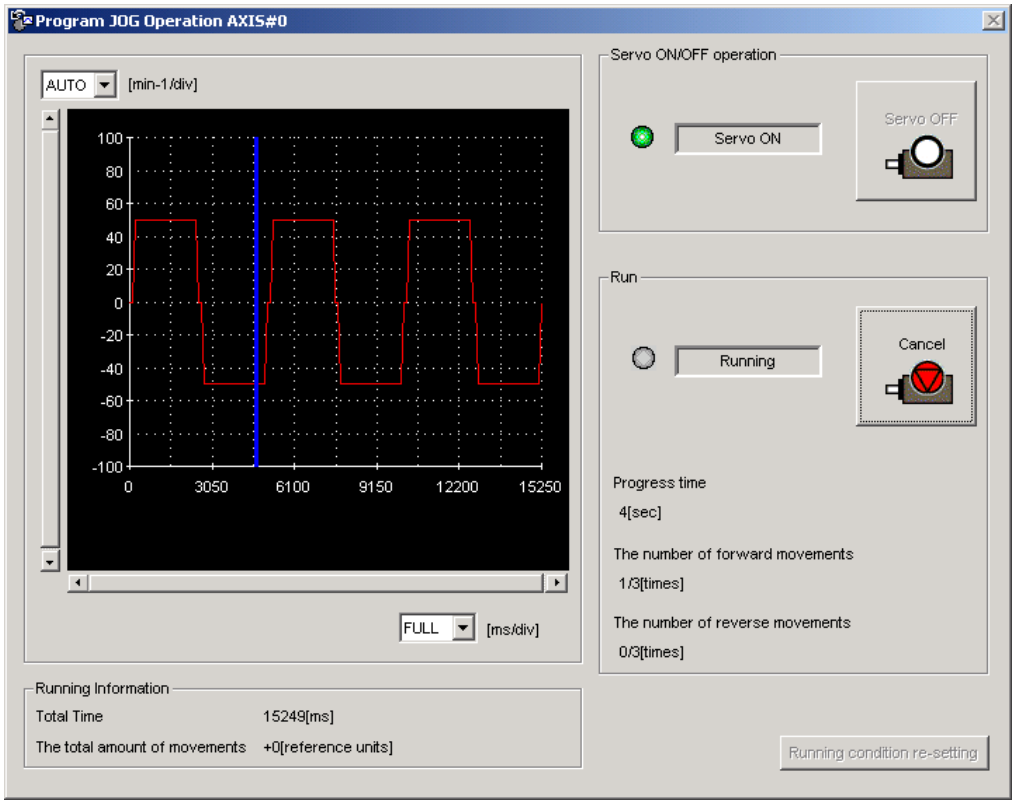
2. Click **OK**, and the Running Condition Setting box appears.



3. Set the running conditions and click **Apply**. The graph for the operation pattern is displayed.
4. Click **Run** and the Program JOG Operation box appears.



5. Click **Servo ON** and **Execute**. The program JOG operation starts.


Program JOG Operation AXIS#0
AUTO
[min-1/div]
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
3050
6100
9150
12200
15250
FULL
[ms/div]
Servo ON/OFF operation
Servo ON
Servo OFF
Run
Running
Cancel
Progress time
4[sec]
The number of forward movements
1/3[times]
The number of reverse movements
0/3[times]
Running Information
Total Time
15249[ms]
The total amount of movements
+0[reference units]
Running condition re-setting

6. The recommended the parameter for each actuator

The recommended the parameter for each actuator. Please change the parameter values by use of the customer. A mechanical resonance may occur depending on the configuration or the mounting orientation of the transferred object. Please change the parameter in the initial setting.

Refer to “LECYM Operation Manual”, Section 4 and Section 5 and Section 10 for details.

6.1 The recommended value of the parameter [LEF]

Series			LEFS25			LEFS32			LEFS40		
	Lead symbol		H	A	B	H	A	B	H	A	B
	Lead		20	12	6	24	16	8	30	20	10
Parameter	Para. No	Initial value	Recommended value								
Servomotor Rotation Direction can	Pn000	0000	**0001 (+:Counter motors side)**								
Tuning-less Function Related Switch	Pn170	1401	1401								
Electronic Gear Ratio (Numerator) *1	Pn20E	4	**65536**								
Electronic Gear Ratio (Denominator) *1	Pn210	1	**1250**	**750**	**375**	**1500**	**1000**	**500**	**1875**	**1250**	**625**

Series			LEFS25(L,R)			LEFS32(L,R)			LEFS40(L,R)		
	Lead symbol		H	A	B	H	A	B	H	A	B
	Lead		20	12	6	24	16	8	30	20	10
Parameter	Para. No	Initial value	Recommended value								
Servomotor Rotation Direction can	Pn000	0000	0000 (+:Counter motors side)								
Tuning-less Function Related Switch	Pn170	1401	1401								
Electronic Gear Ratio (Numerator) *1	Pn20E	4	**65536**								
Electronic Gear Ratio (Denominator) *1	Pn210	1	**1250**	**750**	**375**	**1500**	**1000**	**500**	**1875**	**1250**	**625**

Series			LEFB25	LEFB25U	LEFB32	LEFB32U	LEFB40	LEFB40U
	Lead symbol		S					
	Lead		54					
Parameter	Para. No	Initial value	Recommended value					
Servomotor Rotation Direction can	Pn000	0000	**0001 (+:Counter motors side)**	0000 (+:Counter motors side)	**0001 (+:Counter motors side)**	0000 (+:Counter motors side)	**0001 (+:Counter motors side)**	0000 (+:Counter motors side)
Tuning-less Function Related Switch	Pn170	1401	1401				**2301**	
Electronic Gear Ratio (Numerator) *1	Pn20E	4	**65536**					
Electronic Gear Ratio (Denominator) *1	Pn210	1	**3375**					

: Different from the initial value.

*1 : The minimum unit of the travel distance of the actuator should be 1 [μm]. It is necessary to set it on the PLC side according to the kind of PLC.

6.2 The recommended value of the parameter [LEJ]

Series			LEJS40			LEJS63			LEJB40	LEJB63
	Lead symbol		H	A	B	H	A	B	T	
	Lead		24	16	8	30	20	10	27	42
Parameter	Para. No	Initial value	Recommended value							
Servomotor Rotation Direction can	Pn000	0000	**0001 (+:Counter motors side)**						0000 (+:Counter motors side)	
Tuning-less Function Related Switch	Pn170	1401	1401							
Electronic Gear Ratio (Numerator) *1	Pn20E	4	**65536**						**131072**	**65536**
Electronic Gear Ratio (Denominator) *1	Pn210	1	**1500**	**1000**	**500**	**1875**	**1250**	**625**	**3375**	**2625**

: Different from the initial value.

*1 : The minimum unit of the travel distance of the actuator should be 1 [μm]. It is necessary to set it on the PLC side according to the kind of PLC.

6.3 The recommended value of the parameter [LEY]

Series			LEY25/ LEYG25			LEY25D/ LEYG25D			LEY32/LEYG32			LEY32D/ LEYG32D		
	Lead symbol		A	B	C	A	B	C	A	B	C	A	B	C
	Lead		12	6	3	12	6	3	20	10	5	16	8	4
Parameter	Para. No	Initial value	Recommended value											
Servomotor Rotation Direction can	Pn000	0000	0000 (+:Counter motors side)			**0001 (+:Counter motors side)**			0000 (+:Counter motors side)			**0001 (+:Counter motors side)**		
Tuning-less Function Related Switch	Pn170	1401	1401											
Electronic Gear Ratio (Numerator) *1	Pn20E	4	**65536**		131072	**65536**		131072	**65536**		131072	**65536**		
Electronic Gear Ratio (Denominator) *1	Pn210	1	**750**	**375**	**375**	**750**	**375**	**375**	**1250**	**625**	**625**	**1000**	**500**	**250**

Series			LEY63				LEY63D		
	Lead symbol		A	B	C	L	A	B	C
	Lead (Including pulley ratio)		20	10	5	5(2.86) (Pulley ratio 4/7)	20	10	5
Parameter	Para. No	Initial value	Recommended value						
Servomotor Rotation Direction can	Pn000	0000	0000 (+:Counter motors side)				**0001 (+:Counter motors side)**		
Tuning-less Function Related Switch	Pn170	1401	1401						
Electronic Gear Ratio (Numerator) *1	Pn20E	4	**65536**		**131072**	**229376**	**65536**		**131072**
Electronic Gear Ratio (Denominator) *1	Pn210	1	**1250**	**625**	**625**	**625**	**1250**	**625**	**625**

: Different from the initial value.

*1 : The minimum unit of the travel distance of the actuator should be 1 [μm]. It is necessary to set it on the PLC side according to the kind of PLC.

Revision history
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